

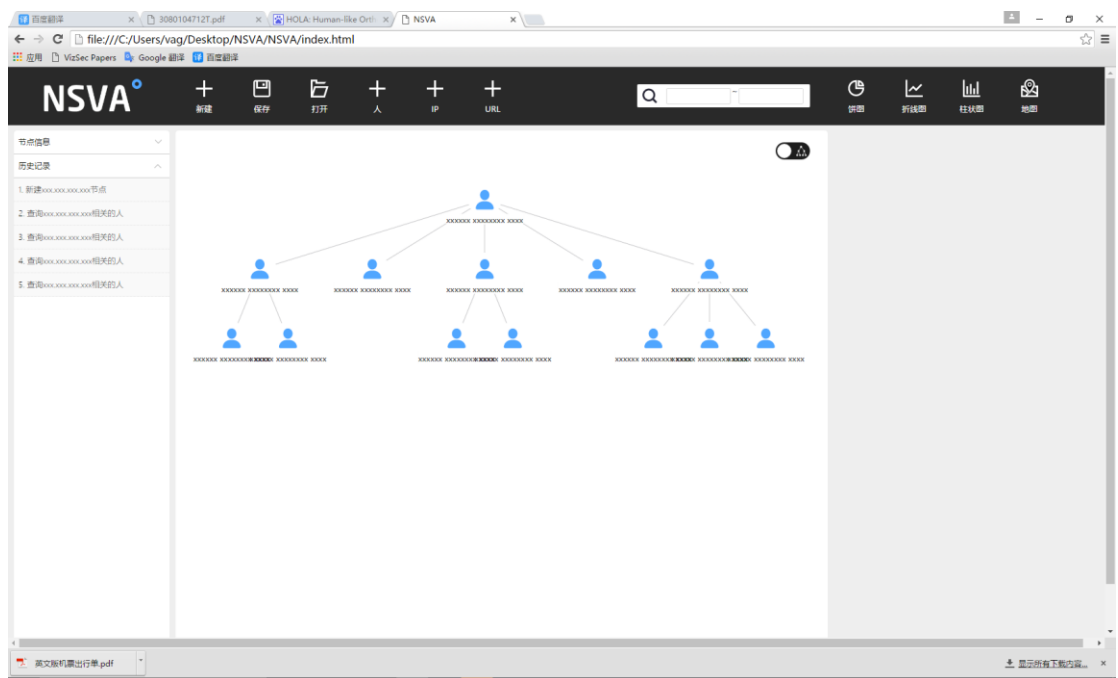
Weekly Report

2016.0808-2016.0814

1 This Week

Security Project

1. Finish preparing the bidding documents. Confirm the final version of the bidding document, print them and stamp on it.
2. Keep on the coding part of security project:
 - 1) Finish the history record function. Users are now able to see each operation made to each node precisely on the history log panel. They are also allowed to go back to any previous results after a specific operation by clicking at the certain recorded step.



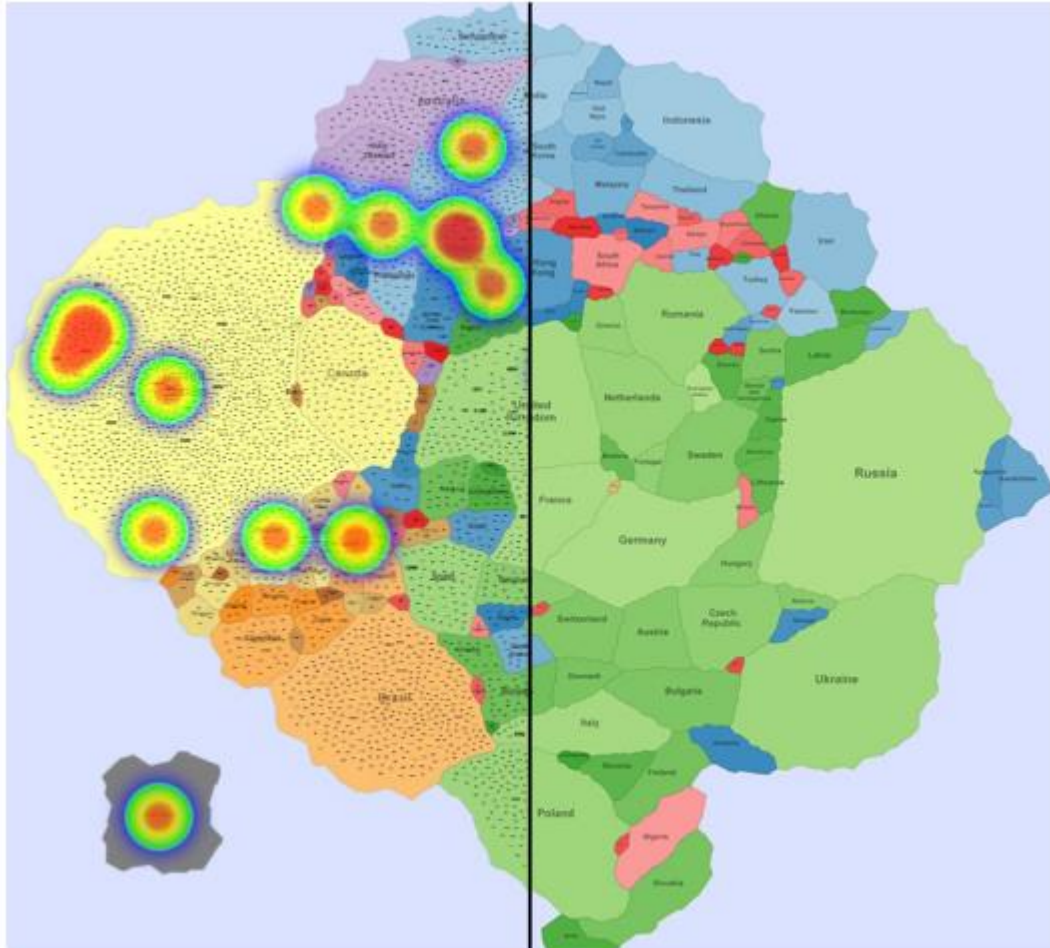
- 2) Finish the zoom in/out function. The main panel of the system is now able to zoom in and zoom out to make sure that users can have a clear view of the topological structure and also detail information about each node.
- 3) Revise some bugs about the conflict between interactions like drag, zoom and click (Under the help of Xia Jing). It turns out that adding too much interactions to a single website is not smart, especially when the response mechanisms of these interactions are similar and conflicts with each other. The computer cannot ideally tell which interaction you are exactly taking, so it might respond to every possible interaction in an unknown order.

Survey

1. Write a part of the survey of Zongzhuang. (Not Finished yet)
2. Going to revise and polish his survey. (But haven' got his version yet.)

Paper Reading

1. IMap: Visualizing network activity over Internet maps



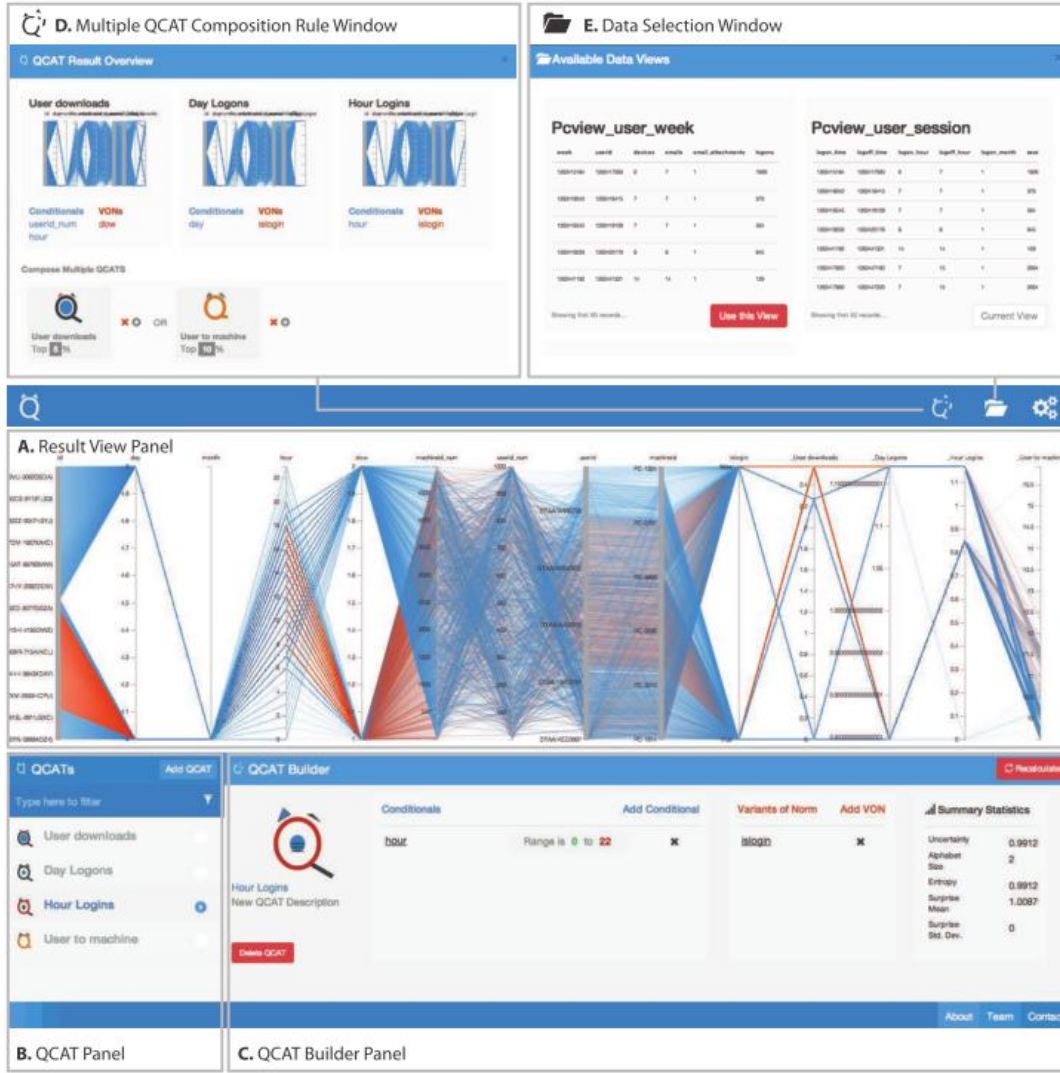
This paper uses a canonical internet map which resembles a geographic map of the world to show the internet topology at the AS level as well as aggregated IP traffic activity. The whole map is built in a three-stage process:

- 1) Construction of the AS Graph Topology
- 2) Generation of the Canonical Map
Including graph embedding, map defragmentation, and final diagram generation.
- 3) Heat Map Overlays

The methods used in this paper to build this map are all existing methods in other research works. But the idea that to show network topology with a constructed canonical map is great and useful. Network topology also needs geographical information.

2. Multiple Queries with Conditional Attributes (QCATs) for Anomaly Detection and

Visualization



The main contribution of this paper is that it provides an information-theoretic method (one of the common anomaly detection techniques) to compute anomaly scores of data records in conjunction with querying skills.

Definitions:

$$A = A_{cnd} \cup A_{von} + A_{ins},$$

Where $A = \{a_1, a_2, \dots, a_n\}$ be a set of n attributes in a dataset, A_{cnd} for all Conditional Attributes, A_{von} for all Variants of Normality (VONs), and A_{ins} for the rest of attributes in A (considered to be insignificant so that it can be excluded from the computation).

Computing Steps:

1. Given a record R , we first retrieve all records that have the same conditional attribute values as R , e.g. R_1, R_2, \dots, R_W
2. Consider only the variants of normality defined by $A_{von} = \{x_1, x_2, \dots, x_j, \dots, x_s\}$. In conjunction with a binning scheme, each attribute x_j may take valid values that are mapped to a set of t_j bins $B_j = \{b_{j,1}, b_{j,2}, \dots, b_{j,t_j}\}$

to provide users with an entry to choose a suspicious focal sample and begin his research.

4. Visual Analysis of Large Graphs: State-of-the-Art and Future Research Challenges

This is my favorite survey about graph visualization. Actually, there' s not so much survey about graph as I thought. Before this one, there' s only two: one about layout and interactions in 2000 (too old) and one about task taxonomy in 2006.

Unlike the previous two, this one gives an overall explanation of graph. It starts from its definition and classification, then introduce visualization techniques for each type of graph, discuss interactions in graph visualizations, summarize graph analysis and finally introduce future challenges.

Personally, I consider this survey as a textbook for on-the-way graph visualization researchers. But experienced researchers can also benefit from it.

5. Task Taxonomy for Graph Visualization

This paper discusses tasks of graph visualization. It presents low level tasks against high level tasks and lists graph visualization task taxonomy.

Based on this work, graph visualization task taxonomy can be classified into: topology-based tasks, attribute-based tasks, browsing tasks and overview tasks.

When we design graph visualization, this paper may help a lot.

TODO

1. Help with Zongzhuang' s survey.
2. Revise and debug the security project system.
3. Revise my survey about network anomaly according to the reviewers' advice.
4. Have a trip in Inner Mongolia and Beijing.